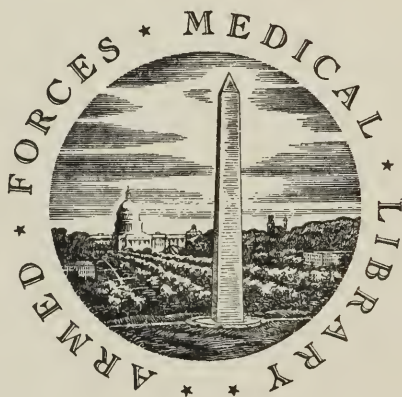


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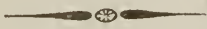
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WASHINGTON, D.C.

AN
INAUGURAL ESSAY,
BEING A
COMPARATIVE INQUIRY
INTO THE
PROPERTIES AND USES
OF
OPIUM.

SUBMITTED TO THE EXAMINATION OF THE REV. JOHN ANDREWS, D. D. PROVOST, PRO TEMPORE, THE TRUSTEES AND MEDICAL PROFESSORS OF THE UNIVERSITY OF PENNSYLVANIA, ON THE EIGHTH DAY OF JUNE, 1803,

FOR THE DEGREE OF DOCTOR OF MEDICINE.

——
BY ROBERT CARTER OF VIRGINIA.

“DIES DOCEAT”—*Gaubius.*

PHILADELPHIA:

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UNITED STATES.

1803.



TO CASPAR WISTAR, M. D.

OF PHILADELPHIA,

ADJUNCT PROFESSOR OF ANATOMY, SURGERY,

AND MIDWIFRY,

IN THE UNIVERSITY OF PENNSYLVANIA,

THIS ESSAY

IS INSCRIBED,

AS AN HUMBLE TESTIMONY

OF RESPECT,

BY

HIS OBLIGED FRIEND AND PUPIL,

ROBERT CARTER



INTRODUCTION.

IN submitting this imperfect essay to the consideration of the tribunal before which it is to appear, I shall consume no time in an unavailing exordium in apology for its insufficiency, but observe only, that in undertaking to express my thoughts upon the subject of Opium, I found myself embarked in an enterprize which required more time and talents than I had to devote to it.

God has strewed this globe with an endless variety of plants. Inquisitive man, emboldened, partly by curiosity, and partly by necessity, discovered, that these were endued with esculent or noxious properties. In process of time he learnt, from the various analogies with which he found himself encompassed, that the beneficent Creator, who had so liberally scattered abroad the means of subsistence, could not

be reproached with having formed any thing in vain. He therefore suspected, that these seemingly noxious plants might be the repositories of something useful ; and, by little and little, became so bold as to handle, and even to apply to them the surer test of taste.

It is natural to suppose, that the earlier attention of man was turned to the vegetable kingdom, the objects of this being every where within his reach, and, as it were, inviting his inquiries ; whilst the more deep seated treasures of the earth, being more partially distributed, and hidden from his view, must have opposed great obstacles to his labours, and often have eluded his search altogether. Accordingly it is written, that Solomon knew every plant, from the cedar of Lebanon to the hyssop on the wall.

As far as I can learn, no satisfactory account has been handed down, of the manner in which this great gift was first discovered. Some say the credit is due to a Grecian, who, being forced to take shelter at night near a number of poppies, found himself so oppressed by drowsiness, that he continued within their influence until the following morning, when, with difficulty, he roused himself. Others incline to think it of Egyptian origin. However this may be, it appears that Homer describes a drug possessing the properties of opium, which Helen received from the wife of an Egyptian. But it would seem pretty well agreed, that Hippocrates was the first who recommended its internal exhibition as a remedy in disease.

The botanical history of the plant from which opium is obtained will form no part of this inquiry; and there have been such ample details of its pharmaceutical preparations, and component parts, when exposed to chymical analysis, that little else is left me than merely to glance at what is already familiar. Nor can I confidently promise much more originality, in the investigation of its properties, effects upon the animal economy, or application in disease; but shall, with great diffidence, offer a few desultory remarks on these several heads. A circumstance by no means suited to lessen my diffidence in the selection of my subject was, that it had solicited the attention of some of the ablest experimentalists. But when we reflect upon the vague notions which have been entertained, until within a short space of time, on the subject of one of the most important articles of the *materia medica*; the still looser manner in which it has been used in diseases, depending upon the most opposite states of the system; and still more, when we find physicians believing it sedative, yet uniformly flying to its aid, in cases decidedly requiring the most active stimulants, is it not high time to explore a road which may lead to something like rational theory or principle, something to guide our bewildered footsteps in a wilderness in which experience, ~~alas!~~ too often leaves but a faint vestige behind?



COMPARATIVE INQUIRY,

&c.

THE drug called opium, brought to this country in form of an inspissated extract, is a dark brown* gum resin, and is obtained from the *Papaver Somniferum* in Turkey, Egypt, the East Indies, and other parts of Asia.

It is said by some to be the expressed juice of the plant, reduced to proper consistency by heat;—but the best received opinion seems to be that of Kemfer, “that it is obtained by simple incision, made in the head of the plant.”†

* The dark colour of opium is said to be merely an incidental circumstance, depending upon the iron instrument, with which the incisions are made, being a pale brown, if glass be used for the same purpose.

† Professor Barton. *Lects. Mat. Med.* 1803.

The seeds contain no farina, but by pressure yield much oil, which is destitute of any deleterious qualities.

It gives out its virtues to proof spirit, wine, or vinegar.

It contains gum and resin nearly in equal proportions, fecula in the proportion of one fourth, and an inconsiderable residuum of saline and glutinous matters.

To the taste, it is bitter, warm, pungent. Authors differed, some time, as to the particular parts in which its properties resided ; though I believe it is now generally admitted, that although the resin be more active than the gum, yet they are both essential to its full effects.

Astringency has been ranked among its properties, and no doubt with propriety ; but as far as the proof of the existence of this property depends upon the circumstance of a black colour being produced by the admixture of the sulphate of iron with certain substances, there appears to be room for hesitation. First, because a black colour results, from the application of this test to many articles which are not considered important astringents, as the holly hock and sage. Secondly, because a black colour is produced under the above circumstances, when we have every

reason to suspect that no astringency whatever is present, or effective in the experiment ;—thus, if to a portion of the gallick acid, some magnesia be added, still a black colour is produced, when a solution of the sulphate is poured on, though it is presumable, that the astringent principle is absorbed by the earth. And thirdly, because no black colour at all is produced, when the astringency is sensibly increased ; for if a portion of the sulphurick acid be added to the gallick, no black colour is produced, when a solution of the sulphate is poured on.* However this question may be decided, it seems certain, that the black colour is sometimes produced, by the action of acids upon iron, when there is no probability of the presence of an astringent, as when we dip a piece of polished iron into a pure vegetable acid.

Few experiments seem better entitled to attention than those instituted by Dr. Leigh, with a view of detecting the essential oil in opium ; and few inferences more just, than that the most active properties of this article reside, in great measure, if not wholly, in the essential oil.—He found, that the resin which we before said was the most active part, when deprived of the oil, became nearly inert ; nor did the gum, after similar treatment, exert more than a fourth of its usual force. Nor has the ingenuity of the last mentioned gentleman left us in the dark as to the nature of the saline portion of our medicine. By a

* Professor Woodhouse. *Chemical Lectures*, 1803.

variety of analogical inferences, from repeated experiment, he found, that the acid salts of sugar and opium, possess properties very similar. But notwithstanding the unequivocal aids which we derive from botanical affinity and chymical analysis, it is to be lamented that neither the one, nor the other, is an infallible guide, in our researches after the properties of articles of the *materia medica*. Of this we need no further proof than the familiar fact, that, from the bare physiognomy of plants, we should often be led to confound those of very different properties; as the tobacco and mullein, fox-glove and comfrey, parsley and hemlock. And how mortifying is it to advert to the fact, that after all our boasted chymical progress, the secret essences of things, should so far elude our most assiduous investigations, as that the analytical result of the deadly venom of the viper should differ little, or not at all, from that of the mild, the nutritious gum!

I will conclude this part of the subject. by observing, that from the demand for opium, and the facility with which a similar substance may be obtained from other vegetables, there is great reason to suspect adulteration.* To detect this, as well as to depurate the medicine of any impurities, I beg leave to subjoin a mode by which none of the active properties can be

* This is sometimes practised by the extract of a species of Lettuce. A Mr. Ricketson, of New-York, has procured good opium from poppies cultivated by him in that place.

injured, viz. To an ounce of common opium of the shops, add six ounces of alcohol diluted with an equal quantity of soft water; let them digest in a gentle heat for four days, during which, they should frequently be agitated; then filter and evaporate, by a very gentle heat, down to the consistence of an extract. By this mode, the medicine is obtained in purity, and the dose can be ascertained with accuracy. Nor is this last a matter of little moment. Doctor Rush has experienced the desired effect from a dose of laudanum, not exceeding five drops, where he does *in c* not hesitate to declare it as his opinion, that ten would *where* have defeated his intention.

Is it not highly presumable, that a more intimate knowledge of the dose and properties of this invaluable remedy, and of the ratio between the varying states of the human system, would enable the physician to perform cures, in cases which now baffle all his skill? I am willing to indulge the hope that it will be so, and that the period is not very remote. Already has the investigation of its properties been so successfully engaged in, as to throw much light on its nature and effects. Already has the labyrinth of disease been divested of much intricacy, by pursuing nature through her mazy windings, by the clue of home-born intellect.

It is hoped, that no apology will be required for omitting the consideration of the various preparations of opium, as they are now pretty well agreed upon.

Upon grounds very different, I solicit exemption from the task of developing the *modus operandi*, namely a consciousness of total incompetency.

In whatever point of view we contemplate this part of medical science, we find sufficient cause of humiliation. I believe it is now generally admitted, that our medicine exerts its characteristic properties, whether applied externally or internally; though there is a difference in the effects as to degree. It would not appear safe to admit its operation solely through the medium of the nerves; for its effects are universally felt, after all nervous communication between the part to which it is applied and the rest of the system is cut off:—Thus, if the brain and spinal marrow of a frog be destroyed, and a solution of opium be thrown into the stomach, it will be found, that the motion of the heart will be affected as readily as when the nervous system was complete;—and if all nervous connexion between the trunk and lower extremities be done away, the same effects follow, as if no such disunion had taken place. Although I do not mean to question the absorption of medicines, I nevertheless think it very doubtful whether absorption will avail us in clearing up this mystery;—for, when a solution of opium is thrown into the cavity of the abdomen, it manifests its effects upon the motion of the heart; and that in so short a time, that we are compelled to relinquish the idea of absorption, at least as a sole agent. But granting the full operation of

absorption, what inference can be made, illustrative of the mode of action? Does it prove any thing more than that, by means of the absorbent vessels, certain matters are conveyed through the circulation, to the various parts of the body? I apprehend it does not.

It is no less a task of Herculean difficulty to account for the mode of action upon the fluids or solids, independently of the nerves. How then are we to reconcile the familiarity with which writers and practitioners, in attempting to explain the phenomena of sickness and death, have recourse to nervous affections and influences, when we are so ignorant of the physiology of the brain and its continuations? Would it not seem, that the long agitated question, relative to the residence of the soul, is as far from being decided as ever? and that there is as much room for scepticism on the subject of her exclusive monopoly of the encephalon, as there used to be, of that of the pylorous or pineal gland?*

But however difficult to ascertain the *modus operandi*, properly so called, of this, in common with other medicines, we have some consolation in being able to trace its effects with tolerable accuracy, and in some measure to account for them, so as to render our prac-

* Professor Wistar relates a case, which came under his own observation, of a child whose brain was totally obliterated, that is, its texture was so destroyed as to be in a state of complete deliquescence, so as to leave no vestige of brain, but the meninges containing this fluid, and yet the child retained its mental faculties until death.

tice safe, and beneficial. These, together with its application in disease, constitute the objects of the remaining parts of this essay.

It appears very strange, that whilst physicians have been pretty much in unison, as to the properties which indicate the use of opium in some diseases, and even as to its ultimate effects, they should, notwithstanding, tolerate its exhibition in those of an opposite nature, which from its acknowledged character, it ought to aggravate.

I believe the more we incline to retrospect, the more we shall find the sedative operation of this medicine advocated, as well as that of many other more potent articles, which are now held in an opposite point of view.

In order to make myself as intelligible on this subject as I can, it may be proper to premise a brief definition of the two different classes of sedatives, and stimulants, under which this article has been placed by the most reputable authors.

“By sedatives,” says Doctor Cullen, “I mean those medicines, which directly, and without evacuation, diminish all the powers and motions of the human system; and may be divided into narcoticks and refrigerants, as acting more particularly on the nervous, or sanguiferous system.” And under this title, he placed Opium, Alcohol, Belladonna, Conium, and Stra-

monium. Admitting the hypothesis of a subtile fluid inherent in the brain and nerves, upon the motion of which all sense and vital movements depend; and that this fluid is more or less susceptible of motion, at different times, our author declares, “that the operation of sedatives in certain quantity is to diminish this mobility, and even to destroy it altogether.”—Now, although Cullen’s and Darwin’s classes of sedantia and torpentia approach each other very nearly, in their import, how widely do they differ, as to the articles which come under these respective heads?

“Those things,” says Darwin, “which diminish the exertions of all the irritative motions, are termed torpentia.” Under this head we find mucilage, water, bland oils, and all those things of less stimulus than our usual diet. Of these the operations vary with their natures; some acting chymically, some indirectly, by removing the causes of irritation, some by lubrication, and others by abstracting or diminishing the usual stimuli.

From Cullen’s definition of sedatives, that of stimulants might be inferred, viz.—“That they are such substances, as, when applied to the nerves, have the power of increasing the mobility of their fluid, and thereby exciting and increasing the motions and powers of the system.” Although it must be acknowledged, that, under this head, he has arranged many articles which, as being acrid and heating, belong to

this class, yet others, of primary importance, have been omitted.

“By Incitantia,” says Darwin, “we mean those things which increase the exertions of all the irritative motions, thereby increasing the natural heat, force of the arterial system, and all the secretions and absorptions.” No wonder then, that the papaver somniferum should stand foremost on Darwin’s list of incitants.

From what has been premised it would seem surprising, that, notwithstanding the general agreement, as to the nature of sedatives and stimulants, there should be such contrariety of opinion, as to the articles which belong to the respective titles.

“The operation of opium as a narcotick sedative,” says Dr. Cullen, “pervades the natural, animal and vital functions ; thereby unequivocally diminishing the mobility of the nervous fluid, upon which their energy depends, proving universally sedative.” “There is, however, considerable difficulty occurring, as it is to be remarked, that narcoticks, instead of proving always sedative, or diminishing the action of the heart, often seem to be powerfully stimulant with respect to this last, and in their first operation, to increase the force and frequency of its action.” Here, indeed, we could but admire his candour, did he not pursue the delusion.

“But some have imagined,” continues our author, “that in the same narcotick substance, there is a stimulant, as well as a sedative matter ; and that they have foundation for this opinion appears from hence, that the substance of the narcotick is acrid to the taste, and when applied to the skin inflames it ; and that in wine, or other ardent spirit, commonly acting as narcoticks, the stimulant matter is in large proportion, may be readily admitted. But on the other hand, the direct stimulant power is doubtful, as, in many substances, the sedative power appears in masses of so very small bulk ; and in that bulk, the stimulant matter can hardly be in such proportion, as to stimulate the heart very powerfully ; as we know no other instance of a pure stimulant, which, in the same bulk, will have the same effect.”

With deference, I beg leave to ask, if the essence of any particular property of medicines has ever been so completely detected, as to be subjected to geometrical mensuration ; and if not, whether it be not as presumable, that a given quantum of the stimulant property may be comprised within a given volume, as that of a sedative or any other nature ? If we attend to the test of experiment, we find, that in masses of the same bulk, there are very different proportions of the same properties. And is there any more difficulty in conceiving, that one property may be contained within the limits of a cubick inch than another, which, as far as our senses will inform us, is

have

equally immaterial? Or, is the sedative principle alone substantial, and all others visionary and elusive of our search?

But, to stem the torrent of ambiguity, let us see to what pilot he will hoist a beacon, or to what ethereal spirit he will raise his prayer.

“To explain,” continues he, “the stimulant effects which often appear from the exhibition of narcoticks, it seems necessary to assign some other cause than the direct stimulant power of the substance applied, and this appears to be that resistance and consequent activity which the animal economy is suited to oppose to every application which has a tendency to hurt it.— This power is well known in the schools of physick, under the title of *vis medicatrix et conservatrix naturæ*, which, however difficult to explain, must, as a general law, be admitted as matter of fact.”

Upon so intricate a subject as that of the operation of matter upon the principle of life, candour and a recollection of my own insufficiency, oblige me to acknowledge, that a finite understanding cannot grasp all within its too contracted span. But why should a Cullen offer such offence to philosophy, as to require more causes than are both true and sufficient to account for the phenomena of nature? What more do we require, to account for any effect, than such a cause as is consistent with the operations of nature in producing such effects? Why should we require more to explain

the stimulant effects which result from the exhibition of narcoticks, or assign any other cause than the direct stimulant power of the substance applied, whilst we acknowledge such a power in the substance itself? Much less shall we be disposed, at this day, to pay homage to the lawless usurpations of those schools which force obedience to laws illy defined, unexplained, and yet by whose imperious nod we are to receive them as matters of fact. But we should be at no loss to infer the directly stimulant effects of opium, even if we were to pursue this very author throughout his attempts to prove the contrary. We should find, (as an ingenious medical commentator has justly observed*) that “he every where calls to his aid the mysterious *vis medicatrix*” to dazzle the eye, which would pryingly inquire into the cause of all those increased energies which generally flow from the exhibition of this reputed sedative medicine.

When a theory rests upon a disputable or suspicious basis, or totters between the support of contradictory experiments, we are at liberty, nay, it is our duty to doubt, and deny its permanent claim to our assent; but when we find a doctrine which corresponds with the majority of the phenomena of nature, here we may ultimately rest, nor repine at our remoteness from perfection. Perfection is a shadow at which we vainly catch; 'tis a gas too subtile for our material grasp.

* Doctor Caldwell. *Note on Fever. Appendix to Darwin's Zoonomia.*

We have before said, that the advocates for the sedative effects of opium allege, that it directly, and without evacuation, diminishes all the motions and powers of the system, and consequently this power must be extended to its external application, whereby it should directly diminish the sensibility of the part to which it is applied ;—and if we may be allowed to construe its mode of operation, by applying their own definition of sedatives, we must infer that it arises from the direct abstraction of stimulus. How far such a position ought to arrest our attention, I shall endeavour to shew in the sequel. A transient view of those particulars, wherein we find an agreement between articles which are now generally admitted as stimulants and that in question, may tend to throw some light on this subject.

Experiments have been instituted for the purpose of ascertaining the effects of alcohol, ammoniac, electricity, and Opium upon man and other animals when externally applied. The uniform result of these applications to a delicate part, or one denuded of the cuticle, is a sense of heat manifestly painful.—The numerous, and well directed experiments of Dr. Leigh with opium, tend more or less to prove the same. He found that when a portion of the solution of opium in water, was poured into the eyes of young puppies of three or four weeks old, the muscles of the eyes were thrown into violent motion, and every action of the animal was expressive of pain. Upon

examination after some minutes, the tunica conjunctiva manifested evident marks of inflammation. The Doctor then poured some of the same aqueous solution into his own eye ;—the muscles were instantly thrown into action and much pain was felt, for several minutes, followed by a copious flow of tears :—as soon as the eye became quiet, Dr. Ramsay of Virginia, who was present at the experiment, perceived an unusual redness of the eye, which however soon disappeared.

Dr. Crump applied the watery solution to the left eye, and after the consequent irritation subsided, both eyes were washed with spirit ; in which experiment the left eye was much the more sensible. Similar results followed similar experiments upon other delicate parts of the body, as the mouth, nose, urethra, &c.

When alcohol and ammoniac were applied to the denuded frog, the first effect was a considerable increase of the frequency and fulness of the pulse, gradually to a certain point in a given time, and then as gradually subsiding to its former state. On the contrary, when the same applications were very much increased, they destroyed all sensibility and mobility whatever. But the self-same effects were observed to follow similar applications of opium. Hence we find a perfect coincidence of results from opium and articles avowedly stimulant ; equally evincing this proper-

ty, in moderate doses, in a proportional increase of arterial action, but when given in excess, instead of exciting preternatural action, prostrating all action whatever. Nor is this a solitary instance of similar causes producing dissimilar effects, accordingly as they shall have been applied in moderate quantity or excess. "It may be asked," said Dr. Darwin, "whether torpor can be so suddenly produced by stimulation? It would appear so, because great exertion of the irritative motions may be instantaneously produced, without being attended with sensation, and the organs may become torpid, by the sudden expenditure of sensorial power in an instant, as paralysis has often followed the great exertion of voluntary power."

But it will be no less subservient to my views, to consider the operation and effects of our medicine, upon principles of a more modern date. Here we shall find the true contrast of the fore-ground of Cullen.

"Upon the vital functions in its first effects, its stimulant power is discoverable in an increase of the frequency and fulness of the pulse, and a concomitant increase of heat from the accelerated impetus of the secreting system. Some time elapsed, a sense of languor and stupor tending to apoplexy, very similar to drunkenness, is felt."*

* Professor Barton, *Lects. Mat. Med.* 1803.

The stimulant effects of opium upon the natural functions stand no less supported by experiment and observation. It generally allays hunger, which probably is to be ascribed to its affording a degree of that stimulus which is more certainly derived to the stomach from the presence of generous food. It has proved cathartick, it has even salivated; and the names of Darwin, Dover, Haller, and Willis, without involving those of great respectability of a still more modern date, justify the belief that it increases the secretion by the kidneys and perspirative organs.

Of the stimulant effects of opium upon the animal functions, there seems to be the most irresistible weight of evidence. Hilarity and an increased appetite for the delights of Venus are among its exalting effects which are acknowledged even by the inactive Turk; and who does not felicitate himself upon the privilege which it bestows upon wearied nature in composing the languid frame on the downy pillow of sleep? But let it not be supposed, that this last effect is produced by a sedative power, tending directly to abstract stimulus; but on the contrary, that the suspension of volition and other circumstances essential to the state of sleep is to be referred to a very opposite property, namely, that of a highly diffusible stimulus which has, by increasing all the energies of the body, expended the sensorial power, excitability, or by whatever other epithet it may be distinguished, so as to produce that semi-torpid state called sleep.

An experiment of Dr. Ramfay is worthy of attention in this place. At night being unusually drowsy, he took of laudanum thirty drops which roused and enabled him to apply to his books during the night. In the morning his disposition to sleep returned ; he then took an hundred drops more of the same tincture, which, in addition to the effects of the former dose, rendered him gay, e'en to wantonness. Some time elapsed after these unquestionably stimulating effects had subsided ; his feelings were now very unpleasant, and he became alarmed at the violent action of the arterial system. These latter effects and those preceding, in my mind, carry considerable weight. There was every mark of the operation of a powerful stimulant, producing aversion from sleep until the great expenditure of excitability was accomplished ; but so soon as time was allowed for the renewal or accumulation of excitability, subsequent to the operation of the last dose, we find a violent action of the arterial system. Now according to that wise law of the economy so ingeniously developed by the illustrious Darwin, this was to have been expected from the preternatural accumulation of sensorial power consequent to the expenditure ; and this in a shorter time, inasmuch as those parts of the system which are subject to continual action, as the heart and arteries, recover their capacity of action much sooner than those which are only occasionally brought into use, as the stomach and intestines.

In taking leave of this part of the subject, I will merely take notice, that when death occurs from opium it is generally preceded by that species of tetanus designated *opisthotonos* ; but convulsions are not necessarily attendant on death from this cause.*

With this view of the subject, then, how can we hesitate to pronounce, contrary to opinions formerly entertained and still obstinately persisted in by many, that opium is a decided stimulant, manifesting this character throughout the vital, natural, and animal functions ?

The limits to which I am necessarily restricted prevent my stating the many objections which have been urged against the side which I have advocated in this contest, as they do the various arguments which might have been adduced in support of it.

It has been objected by some that the known effects of opium are languor, debility, and a quiescence of most of the motions and energies of the system.

That the thermometer, if applied to the body, indicates a privation of heat sometime after its exhibition.

That it suppresses the secretions and excretions.

* Dr. Alston supposed that as the blood is rendered concrete when mixed with opium out of the body, death might be the consequence of a similar coagulation within.

That it affords relief in many inflammatory pains.

That it induces sleep. And that the voluntary muscles are deprived by it of their irritability.*

These objections, however sanctioned by authority or prescription, so far from obscuring, with the cloud of oblivion, the doctrine here advocated, appear to me to leave no spot overshadowed within its translucent hemisphere.

Within the limits of my answers to these objections, I shall not attempt to collect all the various arguments which a minute investigation might furnish, but will simply avail myself of such observations in reply as are suggested by the objections stated.

The variety of opinions upon this subject has proceeded from the neglect of physicians to attend to the immediate effects of the medicine, having suffered the first half hour or nearly, to elapse previous to observation; whereas some of the most important properties of opium must be in operation within this period.† This is surely a remark highly worthy of attention, more especially as the most characteristic properties of powerful stimulants are quick exhaustibility and diffusibility. Is it not to these very properties that we are to attribute the necessity of repeat-

* Dr. Alexander. *Med. Essays*.

† Professor Barton. *Lects. Mat. Med.* 1803.

ing the dose of opium, at short intervals, in low fevers with debility? Can we deny a directly stimulant power to a substance, by whose operation the pulse, becoming more frequent and full, unequivocally denotes (I had almost said articulates) an increased momentum of the blood, because, truly, languor and debility succeed?

As well might we conclude, that the fatigue and relaxation, which follow the violent exertion of the muscles in laborious exercises, are to be imputed to a sedative cause.

If the thermometer indicate a loss of heat, when applied to the body, during the operation of our medicine; may it not be rationally ascribed to the accelerated evaporation consequent upon the increased action of the cutaneous vessels? In answer to the third objection before mentioned, upon which so much stress has been laid, I feel no reluctance in acknowledging my debt to the great Darwin. "The idea," says this clear-sighted physician, "that opium diminishes all the secretions, except that of perspiration, was founded upon error, arising from inattention to its increasing the energies of the absorbent system, whereby all the secretions which are deposited in receptacles become diminished in quantity, from the absorption of their more fluid and volatile parts."

Its efficacy in hæmorrhage cannot be better accounted for, perhaps, than by supposing that it increases venous absorption.

It is quite unnecessary to be minute in answer to the fourth objection. The testimony of writers and practitioners, antient and modern, combines directly or indirectly against the use of opium in inflammatory diseases, or at least so long as this diathesis be present; no ignoble presumption this of the truth of our doctrine.

In answer to the idea of the soporifick property of opium tending to prove it sedative, I shall offer nothing in addition to what has been already advanced, confident that it rests upon grounds too firm to require additional support from my feeble pen.—Nor does it seem necessary to be more minute in reply to the last objection stated. For in the first place, the observation of Dr. Alexander does not appear to be universally true, as it has been asserted by respectable authority,* that the voluntary muscles are not deprived of their irritability, unless the dose of the medicine be sufficient to bring on convulsions.—And even in this case, it is most probable, that the diminution of irritability is brought on by the waste of sensorial power, induced by the violent contractions; for it was observed, both by Dr. Alexander himself,

* Dr. Alex. Wilson. *Essay on Opium*.

and Dr. Fowler, that if the nerves going to any limb be divided, before the opium is exhibited, the muscles of such limb are not convulsed, nor is their irritability diminished after death, though the medicine be conveyed by means of the circulation to them as well as to other parts of the body. Indeed, it would not be very bold to hazard a doubt whether any article which we are acquainted with, unless it be frigorifick mixtures of a very low temperature, can act by a directly sedative power ; nor even from the presence of these can this effect be of long duration, as it is probable that ice itself, unless constantly applied, tends ultimately to stimulate, because the accumulation of sensorial power will follow the temporary abstraction of heat. It is very probable that on this principle we may account for the sense of heat which every one may have experienced on the surface of the body after swallowing a draught of cool water.

But the stimulant operation of opium is a doctrine not altogether confined to the present day ; at least this idea was entertained by the celebrated Linnæus. Thus we find in his "*Amœnitates Academicæ*"—"*Quamvis opium evacuationes minus ordinarias sistere credatur, sciendum tamen est, illud transpirationem, sudorem, et fluxum lactis ac sæpius menstruorum et lochiorum revera promovere. In lochiis retentis tinctura opii cum admixtâ parte tincturæ croci inter præstantissima est remedia.*"

“*Affluxum lactis opii non impediri, sed intendi omnibus jam est notissimum. Opium etiam agit ut aphrodisiacum ; hoc enim sumpto, intumescit papilla mammarum et erigitur ; unde apud Turcas, aphrodisiacum præstantissimum judicatur.*” Again : “*Sanguinem accelerat, volumenque ejus auget et ad caput determinat. Animum roborat, ebrietatem, et diaphoresin movet, et Venerem stimulat. Sumunt opium Turcæ prælium inituri, ut animum addat, aut metum pellat ; haud aliter ac Europæi nostrates spiritum ex frumento distillatum, aut alias potiones inebriantes.*”

Are there then no practical inferences to be derived from this view of the subject, and no advantages from the rejection of the arrangement of former writers of the *materia medica* ? If it be important to distinguish disease, as it depends upon excess or defect of certain natural causes producing correspondent effects upon the various functions of the human body, is it not equally so to discriminate between the artificial means which we employ to counteract or supply these respective demands ?

The human body, by its inherent connexion with some subtile, mysterious agent, of whose essence we are totally ignorant, is capable of being excited into various motions by the operation of certain causes.—If these be present in a particular quantity, and for a certain time, actions ensue correspondent to the nature, duration, and quantity of these causes. But if they be

increased in these respects beyond a certain point, a state of things results which ought to convince us, that the Deity has imposed limits to this capacity, or susceptibility of action which cannot be exceeded consistently with life.

It seems probable, from the light which has been reflected upon medical science within the last century, that the mean between the two extremes of the highest grade of action and perfect quiescence constitutes health, or that state of the system most conducive thereto. Now if there be a point in this imaginary scale of action, beyond which the pendulum of animal life cannot vibrate, compatibly with health, does it not follow, that in those states of fever which are brought on, or accompanied by preternatural excitement, we should be very cautious in making such applications as are likely to increase that excitement? It is true, to a certain extent, that the instrument here alluded to, tending to produce this effect, has relieved pain and other symptoms which may have depended upon too great action; but experience justifies the belief that this has often been attempted at the highest price.—Records are not wanting to shew the direful consequences of applying stimulating powers to accumulated excitability. “Here an action will be excited far transcending that of ordinary fever.”*

* In the yellow fever of 1793, a patient of mine took, without advice, fifteen drops of laudanum, with a view to

And does not the experience of the ablest practitioners warrant the assertion, that the most valuable effects which have ever been obtained by the use of opium, have been in those states of fever which depend upon, or are accompanied by, that debilitated condition of the system, requiring the most powerful stimulants? as the small pox and typhus fever? With what prospect of benefit would we, in such cases, have recourse to such means as are sedative? And yet who is the physician, however attached to the sedative operation of opium, that will deny its utility, or will not rather fly to its cordial aid to restore his sinking friend from the approaching hand of death?

How illy the admired “golden rule of Dr. Young” accords with the sedative operation of this medicine, and the well known effects of depletion by venesection, will be best ascertained by him who has experienced the incongruity of the simultaneous exhibition of these two powerful remedies.

In order, then, on the one hand, to equalize excitement in cases of excessive action, would it not be safer to abstract the causes which are ever ready to destroy the equilibrium? “Or shall we break down the walls instead of unlocking the doors of the building?”* And, on the other, when a suspension of excitement

relieve a pain in his bowels;—it produced delirium and death in a few hours.

Professor Rush. *Lects. on the Insts. and Pract. Med.*

* Professor Rush. *Med. Inquiries*, Voi. IV.

and excitability is threatened, would we not then call up the whole artillery of medicine to arrest their final extinction?

But this intention must often be defeated, if we ascribe sedative effects to those articles which can produce such, only by virtue of a directly stimulant property.

Here it may be expected that I should enter into a detail of the particular diseases in which opium has been used; and, indeed, if I were competent to the task of exhibiting, in one view, the various cases in which it has proved useful, or the reverse, such an inquiry would tend very much to elucidate this subject. But many reasons dissuade me from attempting this. In the first place, to do justice to such a detail would require a separate treatise: and in the next, it must be obvious from the preceding pages, that I disavow the specific adaptation of remedies to particular diseases. To those, therefore, who are still friendly to the nosological arrangement of diseases and remedies, I hope the former will be a sufficient apology. And to those who advocate the unity of disease, it would be needless to offer any thing in addition to what has been already advanced. It must be incompatible with the principles of these last to confine the use of so valuable and diffusible a stimulant to any one state of fever, as the varying states of the system may indicate its use in some period of every form which fever has ever assumed.

It is notorious that our most valuable medicines have been, at some point of time, considered as specifics, in certain maladies; but it is equally so, that in process of time, as we have become better acquainted with their properties and effects, they have been found equally adapted to certain states of the system, in all diseases, which, however various in their physiognomy, seat, force, or mode of attack, are nevertheless common offsprings of one common parent. But all the advantages of the improvement of successive generations will not be derived to mankind, until we become so dispassionate, so unawed by great names, so depurated of prejudices, and, particularly, of those which lead us blindly to adore antiquity, as to acknowledge the errors of our lives for the edification and benefit of ages yet to come.

In concluding this superficial and faulty essay, I should do equal violence to justice and my own feelings, if I did not ~~thus publicly~~, express my gratitude for the unmerited attention which has been paid me by every professor of the university; and I do most unaffectedly wish them that individual happiness, and that reward in the respect and confidence of their fellow-citizens and the world, to which their virtues as men, and their abilities and assiduity in conducting the medical department of science, in this university, so deservedly entitle them.

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